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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/510,652	02/22/2000	Ralf Bohnke	450117-02428	1553
20999	7590	09/22/2005	EXAMINER	
FROMMER LAWRENCE & HAUG 745 FIFTH AVENUE- 10TH FL. NEW YORK, NY 10151			DEPPE, BETSY LEE	
			ART UNIT	PAPER NUMBER
			2637	

DATE MAILED: 09/22/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/510,652

Applicant(s)

BOHNKE ET AL.

Examiner

Betsy L. Deppe

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 7/12/05.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 49-76 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 49-54, 56-65 and 71-76 is/are rejected.
- 7) ☒ Claim(s) 55 and 66-70 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed July 12, 2005 have been fully considered but they are not persuasive with respect to Ballarin et al. (EP 0 702 467). The arguments with respect to Dolle et al. (US Patent No. 6,160,821) are persuasive and the respective rejections are withdrawn.
2. In response to applicant's argument that it is not possible to determine if Ballarin et al. uses repetition patterns and that Ballarin et al. only discloses modulation states (see page 15), Ballarin et al. teaches transmitting symbols (i.e. repetition patterns) AB and CD to form a preamble. Furthermore, each of these modulation states correspond to symbol in the preamble. (See Ballarin et al., column 3, lines 5-35)
3. In response to applicant's argument that Ballarin et al. does not disclose a plurality of repetition patterns, "AB" and "CD" are interpreted to be the repetition patterns. Since a sequence of ABABABABCD CDCDCD is transmitted, Ballarin et al. discloses a "plurality of repetition patterns." Furthermore, the "last repetition pattern" (i.e. "CD") is phase-shifted in relation to the "other repetition patterns" (i.e. "AB") thereby reading on the claimed invention.

Claim Objections

4. The claims are objected to because of the following informalities:
- in claims 64 and 67-70, "said detection step" in the respective claims should be "said **detecting** step" in order to be consistent with claim 60, line 9; and
- in claims 74-76, "multicarrier" on line 5 should be "multicarriers".
- Appropriate correction is required.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the first paragraph of 35 U.S.C. 112:
- The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.
6. The following is a quotation of the second paragraph of 35 U.S.C. 112:
- The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
7. Claims 51-53, 56-59, 62-64, 73 and 74 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
8. With regard to claims 51-53, it is unclear how the detection means in claim 51, line 5 relates to the receiving means and synchronization means in claim 49. Is the detection means part of the receiving or synchronization means? Or is it a separate means in the receiving apparatus?
9. With regard to claims 56-59, "said detection means" in claim 56, lines 2-3 and 4 lacks sufficient antecedent basis. Furthermore, it is unclear how the detection means in

claim 51, line 5 relates to the receiving means and synchronization means in claim 49.

Is the detection means part of the receiving or synchronization means? Or is it a separate means in the receiving apparatus?

10. With regard to claims 62-64, it is unclear if "a detecting step" in claim 62, line 2 is the same as "detecting" in claim 60, line 9. The detailed description does not appear to describe two detecting steps as recited.

11. With regard to claims 63 and 64, it is unclear whether "said detecting step" in claim 64, line 1 and "said detection step" in claim 64, line 2 refers to the one in claim 60 or in claim 62.

12. Claims 73 and 74 recite the limitation "said successive reference symbols" in lines 12 and 11-12, respectively. There is insufficient antecedent basis for this limitation in the respective claims.

13. Claims 73-76 recite the limitation "said successive repetition patterns" in line 9 of each of the respective claims. There is insufficient antecedent basis for this limitation in the respective claims.

14. Claims 73-76 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The specification, as originally filed, does not describe a transmitter that transmits the reference symbol "using multicarrier of said

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OFDM system” as recited on line 5 of the respective claims. Although page 7, lines 11-12 mentions using the receiving apparatus and synchronization method in an OFDM system, the specification, as originally filed, does not provide additional details about implementation of the receiving apparatus and synchronization method in an OFDM system.

15. Claims 73-76 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The specification does not describe how the synchronizing means or step detects the frequency offset to perform synchronization as recited in the claims. For example, how does the synchronizing means in claim 73 use the reference symbols to detect the frequency offset?

Based on the Examiner's understanding, the disclosed invention appears to be directed to synchronization based on detection of the peak correlation of a reference symbol. The specification does not describe how to detect the frequency offset using the peak correlation or detection or how to use this detected frequency offset to perform frequency synchronization as recited in the respective claims. Therefore, one skilled in the art is unable to make and/or use the claimed invention.

Claim Rejections - 35 USC § 103

16. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

17. Claims 49, 50, 60, 61, 71 and 72 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ballarin et al. (EP 0 702 467 A1, cited in the IDS filed February 22, 2000, Paper No. 4).

18. With regard to claims 49, 50, 60, and 61, Ballarin et al. discloses a receiving means and a synchronising means comprising a cross correlation means (30A) and a detection means (18) wherein there is a plurality of successive repetitive patterns (AB and CD) whereby the last repetitive pattern (CD) is phase-shifted in relation to the other repetitive patterns (AB). (See Figures 1, 2 and 4; page 2, lines 2-13; and page 3, lines 3-24 and 29-51) However, Ballarin et al. does not teach using the same number of samples in each repetition pattern.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the same number of samples in each repetition pattern in order to simplify the means for generating the repetition patterns. Have the same number of samples in each repetition pattern allows the use of similar/identical circuit for generating the repetition pattern.

19. With regard to claims 71 and 72, Ballarin et al. discloses a receiving means and a synchronising means comprising a cross correlation means (30A) and a detection means (18) wherein there is a plurality of successive repetitive patterns (AB and CD)

whereby the last repetitive pattern (CD) is phase-shifted in relation to the other repetitive patterns (AB). (See Figures 1, 2 and 4; page 2, lines 2-13; and page 3, lines 3-24 and 29-51) Although Ballarin et al. does not explicitly teach performing time and frequency synchronization, it is implicit that the receiver in Ballarin et al. must be synchronized in time and frequency with the transmitter in order to accurately recover the transmitted signal. However, Ballarin et al. does not teach using the same number of samples in each repetition pattern. Ballarin also does not teach using the synchronizer in an OFDM telecommunication system.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the same number of samples in each repetition pattern in order to simplify the means for generating the repetition patterns. Having the same number of samples in each repetition pattern allows the use of similar/identical circuit for generating the repetition pattern.

It would have been an obvious matter of design choice to one of ordinary skill in the art at the time the invention was made to use Ballarin et al.'s circuit in any type of transmission system that requires synchronization. The type of transmission system does not affect the functionality or operation of the method disclosed by Ballarin et al.

20. Claims 51, 54, 62 and 65 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ballarin et al.

21. With regard to claims 51 and 62, Ballarin et al. discloses the claimed invention except for a correlation length corresponding to the length of one repetition pattern.

Since Ballarin et al. discloses that the reference sequence may be short to restrict the necessary hardware (see page 3, lines 52-53), it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a window length of one repetition pattern in order to achieve get more precise synchronization while conserving hardware.

22. With regard to claims 54 and 65, Ballarin et al. discloses the claimed invention except for a cross correlation window length corresponding to the length of two repetition patterns. Since Ballarin et al. discloses that the reference sequence may be short to restrict the necessary hardware (see page 3, lines 52-53), it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a window length of two repetition patterns in order to achieve get more precise synchronization while conserving hardware.

23. Claims 52, 53, 63 and 64 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ballarin et al. as applied to claims 51 and 62, respectively, above, and further in view of Huang et al. (US Patent No. 5,991,289).

24. With regard to claims 52 and 63, Ballarin et al. discloses the claimed invention except for a detection means for delaying the output of the correlation means and a subtraction means for subtracting the output of the delay means from the output of the correlation means. Figure 4 of Huang et al. discloses a detection means (162, 164, 165) for delaying the output of the correlation means (10 and 14) and a subtraction means (164) for subtracting the output of the delay means from the output of the

correlation means. (See column 5, lines 1-9; column 5, line 63 - column 6, line 10; column 6, line 43 - column 7, line 8) It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Ballarin et al. with that of Huang et al. in order to enhance correlation performance and to effect synchronization with great precision in an OFDM system. (See Ballarin et al., column 2, lines 6-14)

25. With regard to claims 53 and 64, Ballarin et al. in view of Huang et al. discloses the claimed invention including an averaging means for smoothing the output signal of the detection means. (See also column 7, lines 5-9)

26. Claims 73-76 are rejected under 35 U.S.C. 103(a) as being unpatentable over Isaksson et al. (US Patent No. 5,812,523) in view of Ballarin et al.

27. With regard to claims 73 and 75, Isaksson et al. discloses a receiving means and a synchronizing means, as recited in the respective claims, wherein the synchronizing means cross-correlates a repeated sequence to perform time domain synchronization and performs frequency synchronization. (See Figure 1; column 5, lines 17-50; column 6, lines 3-4 and 29-45) However, Isaksson et al. does not teach receiving a reference symbol as recited.

Ballarin et al. teaches transmitting the recited reference symbol/sequence for synchronization. It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Ballarin et al. with that of

Isakkson et al. in order to enhance correlation performance and to effect synchronization with great precision. (See Ballarin et al., column 2, lines 6-14)

28. With regard to claims 74 and 76, Isaksson et al. discloses a method comprised of a receiving step and a synchronizing step, as recited in the respective claims, wherein the synchronizing step includes cross-correlating a repeated sequence to perform time domain synchronization and performing frequency synchronization. (See Figure 1; column 5, lines 17-50; column 6, lines 3-4 and 29-45) However, Isakkson et al. does not teach receiving a reference symbol as recited.

Ballarin et al. teaches transmitting the recited reference symbol/sequence for synchronization. It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Ballarin et al. with that of Isakkson et al. in order to enhance correlation performance and to effect synchronization with great precision. (See Ballarin et al., column 2, lines 6-14)

Allowable Subject Matter

29. Claims 55 and 66-70 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

30. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Sano et al. (US Patent No. 6,246,735) discloses using a null

section detector (i.e. "gap detection means") and a correlation calculation unit for detecting synchronization. (See Figure 18 and column 15, lines 12-18) However, the null section detector and correlation calculation unit in Sano et al. is not used to confirm the detection of the correlation peak, as recited in claims 67-70.

31. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

32. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Betsy L. Deppe whose telephone number is (571) 272-3054. The examiner can normally be reached on Monday, Tuesday and Thursday.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jay Patel can be reached on (571) 272 - 2988. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Betsy L. Deppe
Primary Examiner
Art Unit 2637